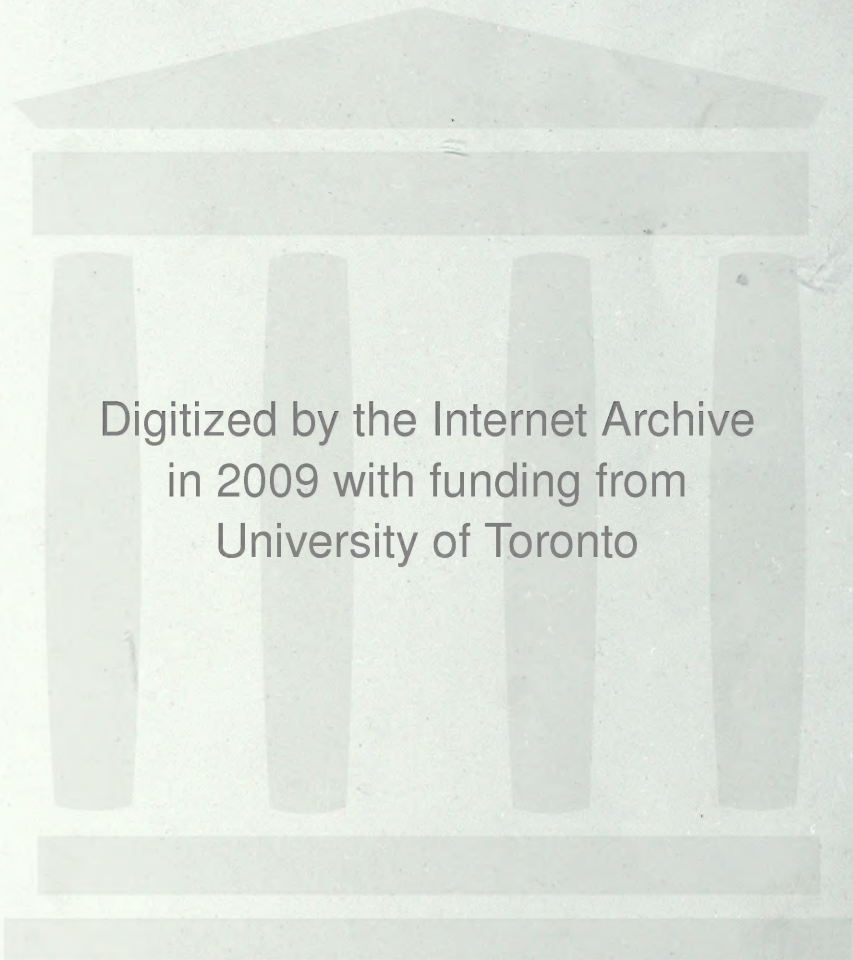

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RADIUM

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CONTENTS

Radium in Surgery and Gynecology, John M. Lee, M. D., - - - - - - - - 77

Radium Treatment of Cancer of the Cervix, Palmer Findley, M. D., - - - - 89

"Damned With Faint Praise", - - - - 94

REVIEWS AND ABSTRACTS

Thomas C. Kennedy, M. D. Radium Treatment of Epithelioma, ... 97

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A MONTHLY JOURNAL DEVOTED TO THE CHEMISTRY PHYSICS AND THERAPEUTICS OF RADIUM AND RADIO-ACTIVE SUBSTANCES

THE ROPER ACADEMY OF MEDICINE
13 QUEEN'S PARK

RADIUM

A MONTHLY JOURNAL DEVOTED TO THE CHEMISTRY, PHYSICS AND THERAPEUTICS OF RADIUM AND RADIO-ACTIVE SUBSTANCES.

Edited and Published by Charles H. Viol, Ph. D., and William H. Cameron, M. D. with the assistance of collaborators working in the fields of Radiochemistry, Radioactivity and Radiumtherapy.

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VOL. VIII. FEBRUARY, 1917 No. 5

RADIUM IN SURGERY AND GYNECOLOGY*

By John M. Lee, M. D., Rochester, N. Y.

I will speak of radium-therapy to-day from the standpoint of the surgeon rather than from that of the radiologist; and I am more strenuous on the side of early surgical treatment of cancer than is usually the case with most doctors. It has always seemed to me that one ought not to wait three or four months before he operates on suspected cancer even if the disease may remain local that long; but that he should remove the tumors as soon as they are discovered and long before a clinical diagnosis can be made. Care should be taken to make the incisions so that they can be neatly closed if the disease is found to be benign. If there is the slightest doubt as to the character of the tumor, a section of it should be submitted to a competent pathologist equipped to make a miscroscopic examination at once, and to determine the diagnosis while the surgeon is yet with his patient at the operating table. By use of the freezing microtome, this requires but a few minutes. If the tumor is found to be benign, the wound may be closed; on the other hand, if it is malignant, a radical operation may be performed,—for example, as is now done in cancer of the breast.

Where the tumor is discovered very early, and a pathologic diagnosis is made, the character of the growth may permit the surgeon to remove the breast alone without danger of a return, and thus avoid the maiming which comes from the radical operation. Eighty per cent. of cystic breast tumors become malignant sooner or later and they too should have thorough surgical treatment.

*Surgical and Gynecological Society. The Journal of the American Institute of Homeopathy, Vol. IX, No. 6, December 1916, pp. 599-616.

Some believe that medicine should be employed for a considerable time before the patient is sent to the surgeon. In my judgment this is a dangerous view to take, as the infection may be disseminated and the patient rendered hopeless during this short period. Cases should be treated by the internist, but not until after the focus of infection has been extirpated. Then the patients should be returned to the careful prescriber for his more efficient treatment. Surgeons are too busy, generally, to look after this branch of the work; and naturally and rightfully it belongs to the more competent internist. It is also much better for the surgeon and his patients for them to be handled by the medical wing of the profession provided they will sound the alarm early where there are recurrences and again provide surgical treatment.

Even when all these measures are carried out, many of the cases will finally become hopeless and inoperable. Then, tumors may develop in sites in which operations cannot be performed or even considered, and under the present careless *regime* the majority of the cases are inoperable. It is these classes of cases that we shall consider during the short time at our disposal.

Fig. 1.

It was four years after the discovery of radio-surgical-therapy, before any scientific attempt was made to screen out rays objectionable to the treatment of cases which required deep penetration; and but little progress was made until 1907. Up to this time, often more harm than good was done, by the agent, as too profound reaction, even surface necrosis, developed long before the hard beta and gamma rays could be applied, for a sufficient length of time to effect deep seated lesions. Thin rubber protectives were finally placed over the applicators, for cleanliness; these supplemented the hard varnish which held the radium in place, and the two together screened out the alpha and soft beta rays. Brilliant results were now secured in the treatment of nevi and superficial epithelioma (Fig. 1), but the deeper seated maladies could not yet be safely reached. When, however, the physics of radium was finally carefully studied and better understood, proper screenage became at once the *desideratum* to efficient use of the ultra penetrant rays and at once the

longest step was taken toward the proper use of the agent in deep seated lesions. Such freshly prepared apparatus requires several months to elapse before reaching full power, due to the accumulation of radium emanation; then its activity is constant for many years, since the radio-activity of radium diminishes by only 1 % in about 25 years; therefore its curative value is but slightly altered in time. In this particular it is unlike the ordinary x-ray tube, which changes its therapeutic value, constantly, even many times during a single treatment. This stability and varied qualities of the radio-activity from radium element, give us fixed points from which to estimate our dosage; this is a most important factor. But there are others of almost equal importance. These are:

1. Amount of the element used, screenage and time of exposure.
2. Age and physical condition of the patient.
3. The histology and pathology of the tissues to be rayed.
4. Site of the growth or disease.
5. Blood pressure, blood constituents, particularly the proportion of leukocytes, and more especially the lymphocytes.
6. Co-existence of syphilis, tuberculosis or nephritis.

The amount of radium to be used depends upon the depth of the diseased tissues to be reached and it should be increased inversely with the square of the distance. The screenage follows closely the same law, and it should be increased correspondingly with the dosage and the time of exposure diminished.

The "toiles" of the French, and the films and other appliances of the Americans, are especially useful in the treatment of skin diseases; for they may be made to cover an arm or a leg at once, and they possess the further advantage of even and accurate applications to uneven and irregular surfaces. A one-twentieth strength film applicator, several inches square, is of great value in the treatment of port-wine birth-marks.

In lichenoid forms of eczema, or acute inflammatory dermal affections, no screens are needed other than the varnish which holds the radium in place. Here the beta rays are largely relied upon to do the work, and they are most efficient; but great care must be taken, else too long exposures develop inflammatory reaction, which should not often occur.

The local effects of radium applications, make their appearance in from a week to twelve days, in the form of dermatitis. This is the reaction of the tissues; blisters may form and desiccation result; the process is progressive for a few days, though at about the third week, the part heals without scarring, and the tissues are left soft and normal. In other instances the reaction is not perceptible macroscopically though it is always present in the tissues, and sometimes systemic depression develops. This process may be minimized by careful screenage and dosage but there is always some reaction from efficient application, no matter how careful one may be, or what technic he employs.

The age and physical condition of the patient are factors that must be carefully considered: In the young the tissues are more susceptible to the rays, and care must be taken else the dosage will be unnecessarily severe. Here, as everywhere, the needs of the patient must be carefully scrutinized, and the rays especially indicated employed; and those known to be objectionable, screened out. In skin lesions all the

rays may be needed from ten milligrams of radium element for two or three minutes; or, all the alpha and the soft and medium beta rays screened out for use in deep lesions as sarcoma, carcinoma, etc. Frequently the gamma rays alone are employed. Five hundred milligram hours radiation, from radium element may be considered a fair dose; though three times that amount may be borne with but little depression or local reaction, if the patient is in fair condition and the apparatus is screened with .5 millimeter silver; .5 millimeter brass; gauze pads of graduated thickness up to an inch, owing to the depth of the disease; and .1 millimeter rubber tissue, next to the skin. The amount of radium element required for such an applicaton may vary from 25 to 500 milligrams of radium element. If the dose is smaller, the time of exposure must be lengthened; and if larger, shortened to get the required number of milligram hours of exposure. As yet it is not known whether smaller doses and longer exposures, or larger doses and shorter exposures, yield better results. One should not attempt general work, however, with much less than one hundred milligrams of radium element though it should be divided up in applicators of various amounts of radium element, from ten milligrams in the varnish apparatus to several twenty-five milligram tubes. It is better for the beginner to start his practice with ten milligrams in a varnish applicator, and confine his work to superficial lesions; then, as his experiece permits, gradually increase his holdings in the radium, until he has a sufficient amount of the element to enable him to reach deep-seated disease.

Care must always be exercised, else harm comes from the use of this most valuable remedy. If the dosage is too small and too long applied, the growth under treatment may be stimulated and aggravated; or if applied as a prophylactic over a healing wound, from a recently removed malignant disease, furuncles and indolent swellings which exude a thick sanious pus may develop. It may require four or five weeks for these to heal; in several cases in which this condition developed, the patients remain well after three years.

When the radium is placed in the ends of long rubber tubes as applicators and carried down to the bottom of the wounds from which malignant tumors have been removed, the applications must be shortened else too much destruction of tissue will follow. In a case of round cell sarcoma of the femoral canal, the femoral vein was encircled by the growth, and a section of it was necessarily removed. Twenty-five milligrams of radium element were carried down to the bottom of the wound, in the drainage tube, and allowed to remain for eight hours. This application was too long; a watery, purulent discharge came through the drainage tube opening for three weeks, when four inches of the femoral vein with the ligature still securely tied to its end, sloughed, and I drew it out of the wound. The patient was discharged at the seventh week with the wound healed, and attends to her duties as a housewife. Her foot and leg to the knee are somewhat swollen, though they do not give her pain nor much inconvenience, and there are no signs of a return of the disease after twenty-six months.

The exposure was too long and I have reduced it in subsequent cases of both sarcoma and cacinoma, which involved the jugular veins of the neck. There were three of these patients and they were all treated substantially the same. The jugulars were tied in two places and divided between the ligatures above the growths. Then the clavicles were divided, and the muscular attachments severed, when necessary, to

permit retraction of the cut ends of the clavicles in all cases to make room in which to work. The tumors were carefully dissected from above downward, and the hemorrhage controlled: when the jugulars were reached near their origin, they were again tied and the tumors removed. In all these cases 25 milligrams of radium element screened by 0.5 millimeter silver, 1 millimeter lead, and 2 millimeters of the rubber drainage tube were left in contact with the deep wounds, to act for four hours. The discharge was thin and after a day or two, straw colored, which continued for two weeks, at which time all the wounds closed, except one, and this finally healed, and good results were secured in all the cases. One year has elapsed since the treatment of the last patient, and one-half and two years respectively, in the other two . In my judgment from two to four hours is about the proper length of time tubes should be buried in the tissues.

I am aware that some surgeons deprecate the use of radium in this way, but I would not undertake the treatment of such hopeless cases as these, unless I could employ radium to supplement the use of the knife.

In the prophylactic treatment of cancer, the technic should be varied to suit the needs of each case; If it be a large wound like that from removal of the breast, several radium tubes should be screened by lead or brass tubes, then crowded into the end of a rather thick-walled rubber drainage tube, and laid in the bottom of the wound from its lower angle to the upper border of the axilla. The tubes should not be placed in contact with large vessels. After they have acted for not be placed in contact with large vessels. After they have acted for a sufficient time they should be drawn into a new site, and so on until all the surfaces of the wound have been carefully rayed. From one to two hours with a dosage of 75 milligrams of the element, will be sufficient for wounds of this character. Of course this rubber tube is used solely for the application of the radium; drainage must be provided with another tube carried through the usual site.

When secondary deposits of cancer are removed from the axilla or other sites, two hours radiation with 25 milligrams radium element will be sufficient. In case of operation for cancer of the cervix, the rectovesical flaps should be carefully closed, and the vaginal wound left open; then when the abdominal wound is sutured, 25 milligram tubes should be laid in the wound and maintained in position with gauze packing for two hours, then removed.

If for any reason it seems unwise to employ the above method, radium should be used in larger dosage, with distance screenage and longer exposure, after the wounds have healed; or, at the latest, when the first manifestation of recurrence appears. It is not in this class of cases that the age and physical condition of the patient are important factors; for this work is borne with impunity, and the local effect alone must be guarded. But in the extensive deposit of cancer, the hitherto hopeless cases, caution as to dosage must be used. The surgeon must proceed with great care after fifteen thousand milligram hours radiation have been administered during a period of three months. Some patients will stand much greater dosage than this, and others will succumb from toxemia due to the great mass of cancerous *debris* liberated in the system.

The histology and pathology have much to with this condition, since regression is more rapid in some kinds of malignant tumors than in others; the squamous cell and the spine cell varieties, particularly, are more difficult to bring into satisfactory condition than other forms

of carcinoma, and the same disease in some tissues is more readily influenced by radium than in others.

Again, the condition of the blood must always be determined for it affords the best indication as to whether the case should be started on small or large doses. Sometimes the leukocytes are down 2000 in cancer, and as they are the chief scavengers of the system, we are at once greatly handicapped in the use of the agent, therefore, progress must be made slowly and with small doses.

I once had a patient with cancer of the rectum with a leukocyte count of 1900, increase to 6200 in the short period of four weeks, and nothing was done except to use the radium cautiously in the meantime. In another case, the blood pressure was 210 and the patient died of apoplexy before regression of the growth could be effected. I now know that the treatment of that patient should have been begun with intravenous injection of radium, and her blood pressure reduced, and her general condition improved before her system was taxed too much by the elimination of the toxic emanations from the growth.

The co-existence of cancer and syphilis must be recognized, else appropriate treatment cannot be employed. Tuberculosis complicates cancer, and frequently lupus degenerates into a malignant type of that disease, and demands the most vigorous treatment. If the kidney is involved the chief channel of elimination in all these conditions is greatly impaired, and one must proceed with moderate dosage, and endeavor to throw part of the work of elimination on other organs. Even then the treatment of such cases is anxious and uncertain.

Nevi of all kinds are acted upon with great satisfaction. The port-wine stains, hairy pigmented blemishes of the face, and cavernous vascular nevi when extended over large areas, were all beyond remedial agency prior to the introduction of radium. Today they may be treated with great success. Restoration of the tissues is produced by the agent, with little or no real destruction of the normal tissues. When coarse hair and thick, unsightly discolored skin are present, the hair is permanently removed and the skin is left soft and pliable. Short exposure of a few minutes, with the unscreened varnish applicator removes the various tinted stains, though the skin over the sites of the growths is slightly whiter than that which surrounds them.

The action of radium is so remarkable that even after four years of experience, I am often surprised at the extent of its inhibitive and restorative effect on neoplasms, both benign and malignant.

Although Martin of Berlin dissents, nearly all other writers credit radium with a selective action for diseased tissues. The few who object to this peculiarity of the element's curative powers explain their theories on pathologic, histologic or other grounds, but all this does not elucidate the problem as the diseased cells disappear with but little injury to the healthy ones which surround them. This is especially marked in most forms of malignant tumors, in which it changes the cells back to more nearly the embryonic type from which they developed. This selective action, no matter how it may be explained, is not so pronounced in growths of epithelial tissue as it is in those of connective structures; neoplasms, here particularly, are about six times more readily acted upon by radium than the normal tissue which surrounds them. In many cases, the growths soften shrink and disappear without destruction of the normal tissue, in such a short period, sometimes two weeks, that the whole process seems incredible, even to the initiated. In other

cases, the pain, hemorrhages, and foul discharges cease, and the part cicatrizes and leaves a soft, yielding scar, without contraction, deformity or unsightliness. Sometimes regression to a marked degree is secured, and the case progresses no further. This fibrosis of the neoplasm may be allowed to remain inactive, or, be excised and the wound rayed or not, as conditions indicate. Again, inoperable tumors may undergo sufficient regression to permit ready removal, and thus bring the patient into good condition.

Radium is a most useful remedy in joint disease, of both specific and rheumatic origin. I am convinced that on two occasions, resection of the knee joint was rendered unnecessary by intravenous injections of fifty micrograms of radium element, repeated several times two weeks apart.

In genito-urinary diseases, the remedy is of service, especially in the milder forms of cancer, as the papillary variety of the bladder; and acts well frequently in those extensively attached growths for which no operation is indicated, except extirpation of the bladder and transplantation of the ureters in the loins, for drainage. In such cases, the dosage must be greater than in inoperable cancer of the cervix and vagina. The squamous cell variety of the disease is very obstinate here as everywhere; and a guarded prognosis must be given if this pathologic variety is known to be present. Various forms of ulcers and hemorrhages of the bladder are favorable conditions to treat. Management of hypertrophy of the prostate, is fast coming into this field; and a number of cases of cancer of this organ have been clinically cured, and remain well after one and two years.

On the mucous membrane of the buccal cavity, roof of the mouth, tongue, gums and pharynx, much skill and patience are required to obtain successful results. One of the greatest aids to secure the tubes in proper position on these sites is No. 20 copper wire. It may be bent to form little eyelets through which silk ligatures may be passed, then securely tied about the rubber and other screens at each end of the tubes, and firmly bound to the wire. This applicator may then be placed over the diseased part and bent over the face, chin or forehead and held in place by adhesive plaster and bandage. If the above apparatus is neatly and efficiently adjusted, it meets the indications much better than is possible by relays of nurses.

The tongue cases, especially, are exceedingly obstinate, and those who have effected cures have accomplished the feat, only by the expenditure of much time, thoroughness and patience (Fig. 2.) These cases are generally spine celled, and where feasible surgery should be combined with radium-therapy. In patients who could not be treated by operation, I have relied upon large dosage of well screened tubes stitched to the tongue, and allowed to remain for from twenty to twenty-four hours. Reaction was somewhat painful and protracted, but good results were finally secured.

The most remarkable regression I have seen in malignant tumors treated by radium, has been in the round cell sarcoma of the neck, parotid gland and face. One case, particularly, was almost miraculous in the rapidity with which the tumor disappeared. A single application caused the pain to subside and the parts to assume nearly their normal appearance in the short period of ten days, and in two weeks there was but little to show that such a deadly disease had existed. It is better to combine good surgery with radium-therapy, if possible, in sarcoma

and carcinoma, though the surgeon should not disgrace his art by the performance of operations on too advanced cases unless he can supplement his work by suitable radiation.

In cervical adenitis, or even Hodgkin's disease, where not too widely disseminated, radium yields excellent results. When most of the lymphatic centers as the neck, axilla, or groins are involved, the growths had better be removed, then the sites and mediastinum, if involved, rayed with heavy dosage and distance screenage.

Fig. 2.

I have seen marked benefit in mediastinal tumors which resulted from carcinoma of the breast. Of course, the cases were not curable on account of general infection, but the growths were greatly reduced, and the patients breathed freely and were made comfortable. The life of one of these has been prolonged for three years. There was general infection when the breasts were extirpated, and metastatic growths have since appeared in one of the women. They developed on her neck, chest, supraclavicular region, scalp, both axillæ, left orbit and mediastinum. Her eye was removed, and the orbit and all other wounds rayed at the time of the operations. The large flat growth of the scalp was not removed, but it regressed completely by the use of the rays. All these applications of radium were satisfactory, but its greatest triumph was in the regression of the flat growth on the scalp, and the great diminution of the size of the mediastinal tumor. In both of these hopeless cases life has been prolonged two or three years, and the patients made comparatively comfortable. I now have three other cases of mediastinal tumor under treatment and the progress is remarkable; the disease has subsided where rayed and the tissues look in the radiograph as though they had been cut out with a knife and a sharply defined border left.

Four cases of malignant disease of the neck and larynx have come under the care. The first was a very advanced case and she was a long way toward recovery when she died suddenly of pulmonary embolism. The

second refused tracheotomy and succumbed before regression could be secured; the third, tubercular larynx, is improving; and the fourth, malignant goiter of the squamous cell type with marked involvement of the thymus, cervical glands and larynx, is also improving satisfactorily. His case was inoperable and he was obliged to have emergency tracheotomy done. When he was received his eyes bulged, he breathed through the tube alone, and he could scarcely swallow. Now the trachea tube is kept corked and he breathes through the larynx; his eyes are improved and he can swallow freely.*

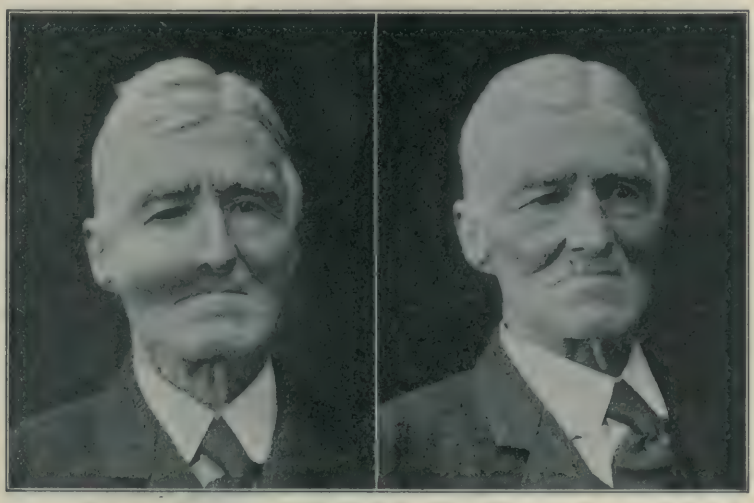

Fig. 3.

Until radium was brought into use, malignant tumors of the antrum of Highmore and the nasopharynx were incurable. The ghastly extirpation of the superior maxillary, afforded relief for but a few months or years at the most. And, as I recall my cases, it is evident that the benefits derived from the operation are not such as to warrant its further continuance, as raying of the growths serves the patients much better. If operation is finally decided upon radium-therapy should also be employed; and where the pathology of the growth is favorable, raying alone will yield better results than operation. (Fig. 3.) This is especially true in sarcomata of the nasopharynx; they are always fatal without the use of radium, and with it the results are astonishingly satisfactory. At first I could not bring myself to believe this, and in several cases I combined surgery with radium-therapy. I now know this to have been a mistake, at least, until radium had been tried; and I believe it will be a long time before I shall use the knife again in these cases, for the large growths disappear promptly and many patients remain well.

Sarcomata and epitheliomata of the tonsils in several patients have yielded excellent results. They are inoperable usually, and while most of the cases yield promptly to radium, some of the pathologic make-ups, as the spine cell carcinoma, require much skill and thoroughness to bring them under control. In one of my first cases, a vigorous powerful man,

*He has since died though his life was prolonged and he was relieved of pain.

with more money than judgment, jerked his head backward through the supporting hands of the nurse, and at the same time yanked the mucous-smeared and slippery braided silk thread out of my hand, just as I was about to seize the tubes in the pharynx with forceps, and swallowed 175 milligrams of radium in three well screened tubes. He refused immediate gastrotomy, and the tubes were passed through the alimentary canal at the average rate of nine inches per hour. No injury followed and he said: "None of the crowned heads of Europe have anything over me in luxurious repasts, for I have had the only distinction of the consumption of a $20,400 meal."

Disease of the thyroid gland offers very favorable results with radium treatment. Like the application of the remedy in most other sites, proper screens, dosage, and careful study of technic are necessary to secure the best results. The remedy should be used in malignant growths either in connection with surgery or alone. Exophthalmic goiter with thymus involvement does not respond to radium as satisfactorily as to operation; yet the cases are greatly improved, and a number of cures have been reported. I can add one to the list. Thyroid carcinomatous growths of the colloid type regress under the action of radium and frequently clinical cures are made. With most recurrences after operation, cures may be expected by the use of radium.

In malignant tumors of the breast, radium is a valuable remedy, especially in recurrences; and I have a number of patients who have remained well three years after several unsuccessful operations had been performed. Inoperable cases should have the benefit of radium, and those suitable to the knife, both surgery and radium.

In the treatment of rectal diseases, radium is a valuable aid; it may be used alone or combined with surgical procedure, and it is, in many ways, of great advantage to the patient; some clinical cures have been made. Polypi, whether in the rectum or bladder, are readily cured by radium, without much annoyance, and there is no scarring or danger. Adenocarcinoma is generally curable, but the squamous cell variety of cancer is more intractable; still we have had clinical cures in some of these cases.

Radium, in the treatment of uterine hemorrhages which persist after several curettages, is a most valuable addition to our present equipment. Great care must be exercised, especially in young women, however, lest amenorrhea and sterility be produced. It acts in a similar way on men if too large dosage be applied to the testes, as they may become impotent if due care is not observed.

Among the most favorable sites for the use of radium is the cervix uteri and vagina, in both operable and inoperable cancer. Some surgeons have progressed so far in radio-surgical-therapy, that they believe raying of malignant diseases of those organs, at any stage, is preferable to operation; but I cannot agree with them in this practice. It is my judgment that where all the growth can be removed, it is better to perform hysterectomy; and immediately ray all the tissues of the incision or, if this cannot be done, keep the patient under observation, then if there is recurrence cause regression by thorough raying

I have seen some of the most brillant results in the treatment of cases of inoperable cancer in this site. Dangerous hemorrhages, excruciating pain, and disgustingly foul odors have been made to dissappear, almost at once; and birth canals and cervices that were involved

from the meatus urinarius to the internal os, to such an extent that the vagnia was closed, regress, and the tissues become soft and yielding, and the cervix assumes more nearly its normal appearance during a single month of treatment. But where the disease extends into the rectum, bladder and broad ligaments, it requires more time; and the treatment of these cases is not so satisfactory as where the disease is confined to the vagina and the cervix; still the results in some of these most pitiable cases are surprisingly good.

In fibroid tumors of the uterus, the action of radium is exceedingly gratifying. Nine-five per cent of the cases are cured, and the balance undergo such regression that the tumors are no longer a source of discomfort to the patients. (Fig. 4).

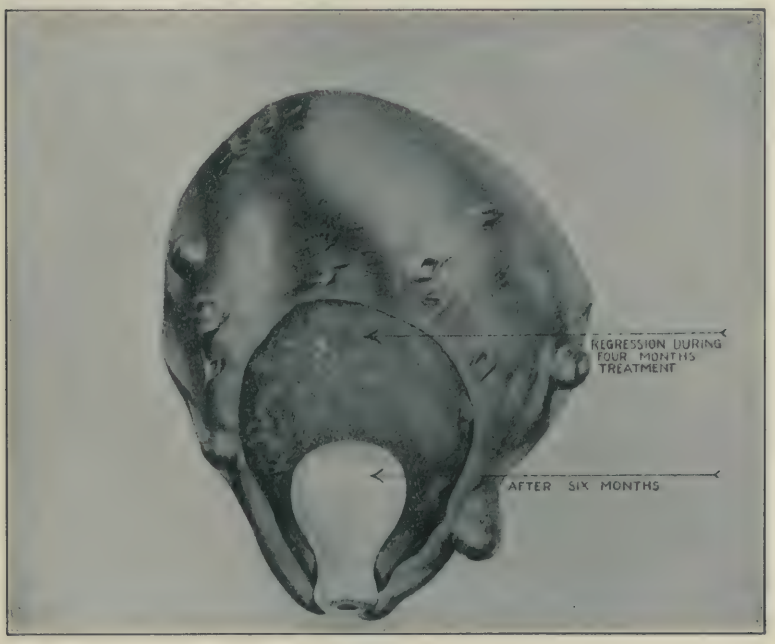

Fig. 4.

These are by no means all the achievements that have been wrought with radium, but I have said enough to show you the wonderful field it has opened in surgery in this short space of time.

Discussion

Dr. H. H. Wiggers, Cincinnati: My work with radium has been especially with the uterus. I have had most satisfactory results in the treatment of fibroid, menorrhagia and cancer. This experience leads me to make this plea. Hemorrhage is one of the most common, in fact the chief sympton by which we are guided in making a diagnosis of cancer of the uterus. The time will come when nearly every woman who reaches the menopause and has an excessive flow will apply to a physician for radium treatment. I think the use of radium at this particular time will prevent a great many cases of cancer, and will have a distinct effect upon these prolonged bleedings. In addition many cases of cancer will

be diagnosed early, if this becomes a general rule. Some operators state that they never have cured a cancer of the uterus by operation. I think that by operating, and then using radium, many cases will be cured, and that many cases in incipiency will not have to have the uterus removed entirely. Cauterization is all that is needed, and then the application of radium will effect a cure. In my experience of a year and a half I have had a number of cases of epithelioma disappear absolutely after three, four or five weeks under radium. There has occurred in a number of cases metastasis to the liver, to the stomach, and general peritoneal involvement. I have gotten in the habit since July of last year of having the Coolidge tube applied over the abdomen after the cancer has disappeared from the local application of radium, using first the curette, or cauterization if the cancer is large, then the use of radium until the growth is entirely gone, and then in six weeks three minutes of the Coolidge tube on the right side over the ovary, and then on the left side once in a week's time, going up two inches more in a week's time, and then two inches more, giving six, eight or ten treatments. This method will assist materially in curing clinically many cases of cancer of the uterus.

Dr. Ashcraft: If Dr. Lee has had any experience with radium in the treatment of tumor of the urinary bladder, I would like to hear what his results have been. In cancer of the urinary bladder, operation offers the only hope. Some time ago, I wrote to the London Radium Institute and asked them to send me a report of all cases of tumor of the urinary bladder treated by radium. There were not any cases reported. Dr. Howard Kelly is one of the most enthusiastic supporters of radium. In an article published in the *Journal of Surgery* a month or so ago, he claims that after trying all methods of treatment, he has decided that cancer of the urinary bladder is not amenable to radium. In the early stages of bladder tumors, fulguration is decidedly the treatment of choice. I do not wish to criticise radium, but its value in my line of work is questionable. I know of only one exception. Dr. Ayres reported a case, in which he had applied radium through a cystoscope. Up to the time that he reported this case his results were very satisfactory. He told me afterwards that the patient had returned to him, and died from diabetes.

Dr. Lee (closing the discussion): Pathological examination in all of these cases is the thing desired. We are equipping our hospital to do this work very thoroughly. Incisions of cancerous tissue may cause dissemination of the disease. This may be equally true when removing specimens for microscopic examination and unless the diesase is so situated that a section can be taken without much trauma, it is safer not to remove tissue for pathological purposes.

I have not had sufficient experience with the treatment of cancer of the bladder to enable me to speak with any degree of authority as to the usefulness of radium in this site.

When we work on such tissues as the lung, the neck or other deep parts of the body, we must increase the dosage and screenage. If we treat the chest we should use an inch of gauze screens faced with rubber over the other screens and then we must increase the dose of radium. The rule is that in deep penetration the dosage must be increased inversely with the square of the distance. The doctor from Cincinnati who has had such good results will find that if he increases his dosage and screenage he can reach tumors of the pelvis, the mediastinum or other deep tissues.

RADIUM TREATMENT OF CANCER OF THE CERVIX*

PALMER FINDLEY, M. D., F. A. C. S.,
OMAHA, NEBRASKA.

The value of radium in the treatment of cancer of the cervix is not as yet established. It is extolled by a few and condemned by many, but the vast majority in the medical profession, of this and other countries, has no settled convictions on the value of radium in therapeutics. Certain it is that radium should be given an extended trial because enough is known of its therapeutic action to justify its use in all cases in which surgery cannot be invoked. My modest contribution to the cause rests in the following abstracts of nine case reports, together with such clinical deductions as seem warranted.

The radium was administered by Dr. D. T. Quigley of Omaha, who has supplied the following notes on his methods of application:

"The radium instruments used in this series of cases are four tubes, each containing a small fraction under 16 mg. radium element, one square applicator containing approximately 16 mg. radium element and a square containing 5 mg. radium element. The squares were used on the abdomen, just above the pubic bone, as cross fire.

"The tubes used in the cervix or in the vault of the vagina were encased in ½ mm. silver.

"In cases where the wall between the vagina and rectum, or between the bladder and vagina were so thin as to make it dangerous to use the silver tubes alone, they were further encased in tubes of 1 mm. brass, and in some cases the brass was further covered with 1/3 to 1/2 inch gauze; this to get distance filtration; and the whole was covered with rubber dam.

"The squares were always covered with 1 mm. brass screens, as only very penetrating beta and gamma rays are of use here.

"In every case the most accurate approximation possible was made between the tubes and the diseased area."

When desiring to apply radium immediately after an abdominal hysterectomy, a half inch pure India rubber tubing is stitched to the vault of the vagina. The anchored end is closed with sutures and is made to protrude about one inch into the pelvis. The tube is long enough to extend beyond the vulvar outlet. The radium is attached to a stiff wire and passed the length of the tube. In this manner the radium is placed partly within the pelvis and partly in the vagina. The radium is readily removed and can be replaced in subsequent treatments with no inconvenience to the patient.

CASE I. Mrs. W., age 58, no pregnancies, entered Clarkson Hospital, October 10, 1914. There was a foul vaginal discharge which later became bloody and was acompanied by pelvic pain and moderate loss of flesh.

Examination revealed an advanced cancer of the cervix and extensive infiltration of the parametrium.

Treatment. Cervix curetted, cauterized and acetone applied. Acetone applied three times in the following ten days. Two weeks later the following applications of radium were made:

*American Journal of Surgery, Vol. XXX, No. 11, Nov. 1916, pp. 337-9.

Six treatments, 12 hours each 32 mg. in silver tubes, together with 20 mg. cross fire on abdomen, 1 mm. brass screen.

I examined the patient two months later and found the uterus freely movable, entire absence of exudate in the pelvis, and the vault of the vagina perfectly healed. Eighteen months later she was again seen by Dr. Quigley who reported a cancer on the posterior wall of the rectum but no evidence of recurrence in or about the uterus. The patient died of the cancerous bowel about eighteen months from the date of the first application of radium.

In this case the disappearance of the pelvic exudate, together with all local manifestations of the disease was most gratifying. It is noted that to the time of her death (about eighteen months after the first aplication of radium) there was no evidence of recurrence in or about the uterus.

CASE II. Mrs. P., age 48, 1-para, complained of a watery discharge beginning June 1913. Later she was distressed with pain in the vagina and left side of pelvis. No alteration in the menstrual flow. There was found a cauliflower cancer of the cervix with marked infiltration of the left broad ligament.

The cervix was curetted and cauterized and acetone applied. The acetone applications were repeated seven times at intervals of three to ten days. The discharged disappeared but the pain persisted.

November, 1914 radium was applied as follows:

Two treatments 36 hours each,
Sixteen treatments 12 hours each;
32 mg silver tube;
20 mg cross fire on abdomen.
1 mm brass screen.

In this case the large number of treatments were given because of the difficulty in controlling the pain and the repeated recurrence of the growth at the vault of the vagina.

Indeed it may be said that the radium had little control over the development of the growth in the excochleated cervix, nor did it lessen the pain. I doubt if the patient's life was prolonged or her suffering lessened by the radium. She died in uremic coma about six months after the initial application of radium.

CASE III. Mrs. L., age 56, 0-para, complained of a heavy dragging sensation in the pelvis for the preceding two months and for three years antedating her admission to the hospital, she had a foul, odorous vaginal discharge. Menopause established at 42 years of age. On admission to the Clarkson Hospital, July 1915, she was found to have an advanced cancer of the cervix with extensive infiltration of the left broad ligament and uterosacral ligaments.

The cervix was curetted and cauterized and acetone applied. At the end of ten days the cellular exudate had largely disappeared and a radical abdominal hysterectomy was performed. Radium was applied at the end of the operation as follows:

July 12	17 hours	32 mg
July 15	11 hours	32 mg
July 17	12 hours	32 mg
July 20	14 hours	32 mg
Total	54 hours	32 mg

Five months later the patient developed intestinal obstruction. The abdomen was opened and the entire peritoneal cavity was found invaded with carcinoma. The patient died soon after the secondary operation.

CASE IV. Mrs. T., age 78, III.-para, entered the Clarkson Hospital, July 1915. For several years she had suffered from articular rheumatism and cardiac incompetency. For the six months preceding admission there had been a bloody vaginal discharge. Examination revealed far advanced cancer of the cervix. The cervix was curetted and cauterized and acetone applied. Radium was later administered in the following manner:

July 14	24 hours	32 mg
July 18	12 hours	32 mg
July 22	15 hours	32 mg
Total	51 hours	32 mg

20 mg cross fire on abdomen.
1 mm brass screen

No improvement was observed and patient died in about three weeks, from what her attending physician called heart failure.

CASE V. Mrs. H., aged 46, was referred to me April 10, 1915 two weeks after amputation of the cervix. A diagnosis of cervix carcinoma had been made by two competent pathologists. A radical abdominal hysterectomy was performed and radium applied as follows:

April 17	12 hours	32 mg
April 18	10 hours	32 mg
April 28	7 hours	32 mg
April 29	14 hours	32 mg
May 10	13 hours	32 mg
Total	56 hours	32 mg

First two treatment 20 mg cross fire on abdomen.
1 mm brass screen.

The patient suffered intensely from an irritable bladder. Later she developed pulmonary embolism but slowly recovered and lived for about one year. The condition of the pelvis at time of death not known.

CASE VI. Mrs. H., age 50, II-para, admitted to the Clarkson Hospital September 8, 1915, when radium was applied to a recurrent vaginal cancer. An abdominal hysterectomy had been performed some months before. Radium applied as follows:

September 8	16 hours	62 mg
September 9	16 hours	62 mg
October 22	14 hours	62 mg
October 24	18 hours	62 mg
February 26	12 hours	62 mg
February 27	28 hours	62 mg
Total	104 hours	62 mg

20 mg cross fire on abdomen.
1 mm brass screen.

Infiltration in the vaginal walls and parametrium disappeared under the influence of radium for a period of four months and then reappeared. Subsequent treatments failed to effect the growth to any noticeable degree and were abandoned.

CASE VII. Mrs. B., age 50, III.-para, was admitted to Clarkson Hospital September 12, 1915. She had passed the menopause at 47 years of age. For three months she suffered from the pelvic and bloody vaginal discharge. There was also cardiac decompensation and extreme anemia.

She had an early cancer of the cervix. A total abdominal hysterectomy was performed and radium applied in the following manner:

October 24	18 hours	62 mg
October 26	17 hours	62 mg
Total	35 hours	62 mg

20 mg cross fire on abdomen
1 mm brass screen

There was no evidence of recurrence ten months after the radium treatments.

CASE VIII. Mrs. A., 55 years of age, V.-para, entered Clarkson Hospital September 20, 1915. Menopause passed at 52 years of age. Complained of pelvic pain and bloody vaginal discharge for three months. Diagnosis, cancer of cervix with no palpable extension beyond the cervix. Radical abdominal hysterectomy performed and radium applied as follows:

October 4	15 hours	62 mg
October 6	16 hours	62 mg
Total	31 hours	62 mg

Abdominal wound failed to unite. Patient died of exhaustion eleven weeks after operation.

CASE IX. Miss C., age 23, 0-para, admitted to Clarkson Hospital July 13, 1915.

Diagnosis: advanced cancer of cervix.

Treatment. Initial curettage and application of acetone; 50 mg of radium were applied for a total of 84 hours at three intervals and at the end of three weeks a radical abdominal hysterectomy was performed. Following operation 50 mg radium was applied for a total of 30 hours in three intervals.

Examination at intervals disclosed no evidence of recurrence until June 1916, when patient returned with a swelling in the right iliac fosca and great pain radiating down the right leg. The abdomen was opened and a group of large glands found. A rubber tube was anchored to the margin of the abdominal incision and its distal end closed with sutures

and placed to the side of the glands. 50 mg radium was carried to the bottom of the tube and left for 4 hours. These exposures with radium were repeated twice. The results are as yet unknown but it was hoped that the pressure pains might be relieved by reducing the size of the glands. The pain had not been relieved three weeks after the treatments.

CLINICAL DEDUCTION.

First:—It will be observed that cases III., V., and IX., which were regarded as inoperable, became frankly operable after the application of the curette, cautery and radium. In each instance no enlarged lymph nodes or infiltrated tissues were observed when hysterectomy was performed. In case IX. the scrapings from the cervix were of a highly malignant type but Dr. Schultz, the pathologist, who made careful search for cancer cells in the removed uterus, was able to find only a nest or two of degenerated epithelium. The logical conclusion is that in radium we have a most valuable agent in transforming an inoperable case into one that is operable. However, we must not imply that such cases are curable. Many of them we know are not cured and the time limit has not yet been reached for pronouncing any of them permanently cured.

Second:—Case II. was not favorably influenced by the radium. There was recurrence in the vault of the vagina very shortly after three successive applications of radium. Here, as in another instance in my experience, radium failed to destroy completely the near lying cancer cells.

Third:—In cases II., IV., VI., VIII., pain was only partly or not at all relieved by radium. In case I., and VII., the pain was promptly relieved. In case V. the pain intensified but was largely accounted for by irritable bladder.

Fourth:—Cases VII., and IX, suggest the importance of applying radium on the operating table following hysterectomy. It is maintained that in so doing implantation of cancer cells at the seat of operation may be prevented. Case V. suffered intensely from an irritable bladder. She was probably overdosed. Case VIII. developed a vesicovaginal fistula which promptly healed spontaneously—she too was probably overdosed. It would seem advisable to limit the number of mg hours in post-operative cases to one-half or one-third the usual dosage.

Fifth:—The rapidity with which the general peritoneal cavity was invaded in case III. suggests that the radium might have had a stimulating effect upon the cancerous growth.

Sixth:—In cases IV. and VIII. the patients failed to react well to the radium treatments. They developed a toxic condition and it was thought that death might have been hastened by the action of the radium. Here again it is possible that they were overdosed.

Seventh:—Two of the nine patients are still living; one after a period of fourteen months, the other ten months. In one there is no evidence of recurrence and in the other (case IX.) the enlarged lymph nodes in the right iliac region, which have lately developed, are highly suggestive of recurrence.

Eighth:—Finally it is fair to conclude that radium has a place in the treatment of cancer of the cervix. It is our most effective means of relieving distressing symptoms, it prolongs life in nearly all instances, it converts many inoperable cases into operable cases, but as yet we can say nothing of the curability of these cases.

"DAMNED WITH FAINT PRAISE"

"Radium as Cure for Cancer is Failure says Head of Crocker Fund of Columbia University."—Cincinnati Enquirer, Dec 18, 1916.

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"Report Radium Fails as a Cure for Cancer. George Crocker Special Research Fund Spends Another Year in Fruitless Quest for Method to Combat Dread Disease. Many Experiments are carried on by Investigators."—New York Telegram, Dec. 18, 1916.

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"Radium Not Cancer Cure. Result of Exhaustive Tests on Rats, Mice and Guinea Pigs Announced."—Macon, Ga., Telegraph, Dec. 18, 1916.

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"Cancer Cannot be Cured With Radium—Wood. Experiments Show Life Can Be Prolonged by Treatment, Says Expert."—Dayton, O., Journal, Dec. 18, 1916.

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"Finds Radium Dangerous in Cancer Cases. Dr. F. C. Wood Reports Under Some Conditions It Spreads Rather Than Reduces Growths. Sanctions Use Only When Operations Are Impossible, and Then Only Under Strict Limitations."—New York American, Dec. 18, 1916.

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"Says Radium Is Failure As Cure For Cancer."—Milwaukee Sentinel, Dec. 18, 1916.

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"Radium Fails as Cancer Cure, Columbia Director Reports. Tumors Stimulated by Small Doses, While Growths Disappearing After Use of Larger Quantities Are Only Quiescent—Recommended to Ease Pain." —Pittsburgh Gazette Times, Dec 18, 1916.

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"Cancer Grows By The Use Of Radium. Dr. Wood, Head of Crocker Research, So Reports to President Butler. Large Quantities Needed. Otherwise Portions of Tumor May Be Stimulated and Harm Done to Patient."—New York Times. Dec. 18, 1916.

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"Says Radium For Cancer Is Failure. Used in Small Quantities It Aggravates According to Research Expert."—Philadelphia Press, Dec. 18, 1916.

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"Radium Not Cancer Cure. Found to Be a Failure After Exhaustive Tests on Rats, Etc."—Rochester, N. Y Chronicle, Dec. 18, 1916.

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"Cancer Tests Failure. Dr. Wood Reports He Is Unable To Cure Animals With Radium."—Columbus, O., Journal, Dec. 18, 1916.

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"Radium Cancer Cure Is Failure, Doctor Says. Specialist Claims Use of Small Quantities is Detrimental to Patient."—South Bend, Ind. News-Times, Dec. 18, 1916.

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"End Of Radium Theory."—Philadelphia Bulletin, Dec. 18, 1916.

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"Radium Failure For Cancer."—St. Louis Republic, Dec. 18, 1916.

"Radium Not A Cancer Cure. Successful as a Palliative Only in Cases on Which Operation Is Not Possible—May Make Patient More Comfortable—Dangerous If Used in Small Quantities."—Boston Transcript, Dec. 18, 1916.

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"Find Radium Failure As Cancer Cure."—Altoona Pa., Times, Dec. 18, 1916.

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"Radium A Failure As A Cancer Cure."—Wheeling, W. Va., Intellingencer, Dec. 18, 1916.

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"Find Radium Is No Cure For Cancer. Also Fails in Tumor Cases, Experts Discover."—Springfield, Mass. Union, Dec. 18, 1916.

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"Radium Fails To Relieve Cancer. After Exhaustive Tests, Much-Heralded "Cure" Is Discarded."—Binghamton, N. Y., Herald, Dec. 18, 1916.

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"Cancer Often Stimulated by Use of Radium."—Rochester, N. Y., Herald, Dec. 18, 1916.

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"Radium Fails as Cure For Cancer and Tumors."—Greenville, S. C., Dec. 18, 1916.

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"Radium Not A Cure For Cancer—Verdict. Use of Small Quantities Only Aggravates the Case."—Reading, Pa., Times, Dec. 18, 1916.

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"Radium Failure As Cancer Cure."—Parkersburg, W. Va., News, Dec. 18, 1916.

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"Calls Radium Failure As Cure for Cancer."—Lafayette, Ind., Journal, Dec. 18, 1916.

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"Radium Only A Palliative. Cannot Cure Cancer, Says Expert After Long Research."—Philadelphia Record, Dec. 18, 1916.

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"Radium Declared No Remedy For Cancer. Columbia University Doctor Says Small Amounts May Even Cause Cancer to Grow."—Columbus, Ind., Republican, Dec. 18, 1916.

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"Radium Failure As Cancer Cure."—Portland, Me., Press, Dec. 18, 1916.

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"Radium Failure In Cancer Cases. Good As Palliative Only, Says Savant After Exhaustive Tests on Rodents."—Birmingham News, Dec. 18, 1916.

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The quotations given above are the headlines of articles which appeared in the daily press throughout the country, the articles dealing with a report of the director of the Crocker cancer research fund.

Medical men are not prone to debate medical subjects in the columns of the daily newspapers. The newspaper versions of Dr. Wood's report have not found a cordial acceptance by those who are in position to realize

the value of radium in the treatment of cancer as evidenced by the letters and interview, which we reproduce below:

"Radium's Uses in Cancer Cases. Dr. Frazier Thinks Prevailing Pessimism as to Its Utility Unjustified and Unfortunate in Its Effects." —Philadelphia Public Ledger, Jan. 6, 1917.

"To the Editor of Public Ledger:

"Sir—The editorial of the issue of the Public Ledger for January 4th on 'Radium and Cancer Cures' I read with interest, and was glad to see the publicity given the statement of Doctor Ewing, of the Cornell Medical School, which, to a limited degree, qualifies the wholesale condemnation of radium so widely advertised in the newspapers of late."

"There is no doubt that the greatest hope of a cancer cure, for the present at least, lies in removal with the knife in the early stages of the growth, and the public needs still to be convinced that surgery cures a certain percentage of cancers, large or small, according to the seat and duration of the lesion. At the same time there are and always will be a certain number of cancers which because of their location or because of delay and proscrastination are not seen by the surgeon in the operable stage and should be treated by radium or the X-ray for three reasons. First because it prolongs life and relieves suffering in many cases, secondly, because it effects a cure in an occasional case, and thirdly, because it is inhuman and cruel to brand people so afflicted as hopelessly ill and beyond the pale of human aid."

"I happen to know that the pessimism recently and widely expressed in the newspapers has had a demoralizing effect upon patients under treatment with radium, and for this reason I was glad to see the qualifying note sounded in your editorial. I have had an opportunity to follow many of the cases under treatment in the X-ray and radium department of the University Hospital under the immediate care of the director, and not only have radium and the X-ray proved of value in the superficial cancers of the skin, but in cancers of large dimensions and deeper-seated. In many of these cases not only is the condition ameliorated and life prolonged, even in the deadliest forms of cancer, but there have been a smaller number of cases in which the growth has entirely dispeared. There should be no fear of the knife on the public's part; the popular tradition that the knife "spreads the cancer" should be dismissed as absolutely without foundation, but those who otherwise have not a ray of hope let us encourage to believe that there remains a remedy which promises a measure of relief and an occasional cure.

(Signed) CHARLES H. FRAZIER."

Philadelphia, January 5, 1917."

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"Still Believes Radium Effective For Cancer. Cincinnati Physician Says His Opinion Is Unchanged."—Cincinnati Times-Star, Dec. 20 1916.

"Cincinnati doctors are interested in telegraphic reports from New York to the effect that Dr. Francis Carter Wood, head of the Crocker Cancer Research fund, declares that the use of radium as a cure for cancer is a failure. A Cincinnati surgeon who told a convention of surgeons at the Hotel Gibson of the encouraging results he had achieved with the use of radium in certain forms of cancer cases, said in this connection Wednesday to the Times-Star: 'Judging from the dispatches it seems to me that the views of Dr. Wood, regarding the usefulness of radium in the treatment of cancer, are too pessimistic.'"

"'Are you as hopeful as to the possibilities of radium as you were when you addressed the convention of surgeons on the subject?'"

"'Yes. Since then, as before that, some cases have died and some cases have been cured. Radium is not going to cure every case but there are certain cases in which it give good results. Radium treatment should not take the place of surgery.'"

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"The Other Side Of The Radium Cure."—Boston Herald, December 2, 1916.

"To the Editor of the Herald:

"Newspaper interpretation of medical subjects, vital to the interests and health of the community, should be peculiarly conservative and well advised. To me your editorial comments on radium in cancer on Wednesday morning of this week seem especially open to criticism on this score.

"Briefly stated, your summing up of the findings of the Crocker cancer commission of Columbia University unqualifiedly placed radium in the discard as a "cure," damned it with faint praise as a palliative, and noted with the cheerful abandon of 'life' opportunity given the medical profession to make 'the patient's condition worse than if he had been left alone.' Such is the pessimistic side of the picture based on truth but, unfortunately for your readers, only half the truth. Simply because radium cannot act as a 'cure' in inoperable or hopeless cases of systemic cancer is no reason why readers should be instructed to regard it as a discarded fad to the utter disregard of countless cases of early malignant disease that this remedy has saved."

"Point out rather to your readers the significance of the recent purchase of many thousand dollars' worth of radium by the Huntington Hospital of this city as an example of how useful it is in experienced hands. Tell them of its curative effects beyond that of any other remedy in epitheliomas or cancers of the skin. Lay your emphasis on how radium can absolutely prevent cancers of the skin if people could be taught to have the early pre-cancerous possibilities such as keratoses, warts, moles, etc., removed before degeneration starts. By such statements it seems to me you would be doing the greater services to the community and more rightly interpreting the findings of the Crocker cancer commission on radium.

J. HARPER BLAISDELL, M. D."

45 Bay State road, Dec. 21.

REVIEWS AND ABSTRACTS.

Thomas C. Kennedy, M. D., (Indianapolis, Ind.), Radium Treatment of Epithelioma. The Journal of the Indiana State Medical Association, Vol. IX., July, 1916, p. 298. Care must be taken not to allow radiation beyond what the normal tissues will stand. In the beginning of my experience with radium, I was fearful of the effects of massive dosage and began with great caution. Never having seen any

untoward effects from the use of radium applied through a filter, and not getting the desired effect in some of the more obstinate cases, I cautiously began the use of it unscreened, using only the air as a filter space. Although finding a greater resulting erythema, which at first seemed alarming, there was a more speedy cure. Following the application there is an erythema of the tissues surrounding the lesion. In two cases there was a dermatitis so severe that it simulated erysipelas. About three days after the application of the radium to ulcerating surfaces, a soft crust forms, under which there is a slight discharge. The patient is cautioned not to disturb the scab in any way, but let it alone until it loosens and comes off, which occurs in two or three weeks. When this scab comes off, a smooth, white scar remains. The cosmetic effect in every case has been far better than I have ever seen after surgery or the use of caustics.

In the treatment of epithelioma of the nose, eyelids, etc., I have almost entirely abandoned the use of metal screens, and simply use the 10 mg. applicator of radium (20 mg. radium sulphate, containing 10 mg. pure radium element) using the air space of ½ inch. In some of the more refractory cases, I apply it directly to the lesion. In cases of epithelioma of the tongue, it is necessary to use from 40 to 60 mgs., which is screened with a metal filter.

The relief from pain is frequently noticed after one treatment, and after two or three treatments there is usually a distinct change in the lesion. The discharge is checked, if there is an ulcerating surface, with a perceptible shrinking of the lesion. It has been the custom of the profession to advocate operation for all skin cancers, but as practically all of them can be cured with radium it should be tried before resorting to an operation.

In superficial lesions, radium is applied in a sealed glass tube. If filteration is deemed necessary, the tube is placed from ½ to 1 inch from the lesion, giving the "air space" filter. The glass tube is wrapped in a small piece of gauze and held to the place with a small strip of adhesive plaster. As a rule, the first treatment is for one hour. I am firmly convinced that all epithelioma, wholly on the cutaneous surface, can be cured with radium, if it is at all amenable to treatment. In other words, any epithelioma of the skin, that does not yield to radium, cannot be cured by any other known methods. While in two extreme cases there has been no marked improvement, there has not been a single case stimulated by the use of radium as has been noted by others. An exceptionally small per cent of cases of epithelioma of the tongue are benefited by surgery, and oftentimes are made worse, glandular involvement ensuing rapidly. Frequent disappointments are met in the surgery of cancer, and men who have had large experience with radium do not claim it as a cure-all. It can no longer be questioned, that, in the treatment of cancer of the face, radium is undoubtedly the method of choice.

It is only by experience, that we can tell whether to use a large amount of radium, thoroughly screened, or, to use a lesser amount, either screened or unscreened. As a routine practice, 10 mgs. of radium is used, screened with the "air space." In some cases, the application is made direct to the lesion. In a very small per cent of the cases it will be found necessary to use 40 mgs., or even 50 mgs., but these are exceptional. The cases herewith reported were treated with 20 mgs. radium sulphate, 50 per cent. strength, containing 10 mgs. radium ele-

ment. In speaking of the amount of radium used, it should refer to radium element contained, as it is used in the form of a salt, of varying strength. Only a few typical cases will be reported here, as it is deemed unnecessary to report many cases in detail.

CASE 1.—Miss V., referred to me by Dr. Denny, of Madison, Ind. Maternal aunt died of cancer of uterus at 60 years of age. Another maternal aunt died of cancer of face. Father died of Hodgkin's disease at the age of 75. Mother died of pneumonia. As near as she remembers, in 1897 she noticed a small ulcerated spot on the right side of forehead. She first received treatment in 1901 with caustic paste. Under this treatment it healed and remained apparently well for several years. Treated again in 1906 but did not get well. Was treated again with caustic paste in 1907. The ulcerated spot did not heal, but a very large scar was produced by the treatment. In 1908 was treated with X-ray about 1 dozen times, and in 1909 took a few more treatments, and again in 1910 without results. In October, 1911, carbon dioxid snow was used without healing. When I first saw her she had a large scar about the size of a dollar on the right side of her forehead. There was a crust in the center of the scar about the size of a quarter, which was very sore, tender and painful, and there was a tendency to bleed on touching it. Radium was applied for a period of one hour each alternate day for two weeks, then applied once a week for about two months. Lesion entirely healed and she apparently is cured.

CASE 2—A. J. B., Columbus, Ind., surgeon, age 66. No family history of cancer or tuberculosis. Father died at the age of 74 of organic heart disease. Mother died at the age of 86 of double pneumonia. Patient had an erosion of tongue for several months which refused to heal. Silver nitrate 40 grs. to the oz. was applied without results. The tongue was so sore he could not masticate his food and had lost weight. Troubled with constipation. He was treated every alternate day for two weeks with radium, and then at intervals of once a week. The lesion began to heal after a few treatments, and was apparently cured after two months.

CASE 3—Mrs. D., age 65, referred to me by Dr. Osterman, of Seymour, Ind. No cancer or tuberculosis in family. A scaly spot appeared on the right side of her nose about 5 years ago. It was treated with salves, powders, and I think from the description, also with caustic paste, without results. When I first saw her, there was an ulcerated spot on her nose about the size of a dime, which bled on touching it. She has had 16 applications of radium of one hour each, and is clinically cured.

CASE 4—Mrs. T., age 52, referred to me by Dr. F. C. Heath of this city. Mother died of cancer. About 18 years ago a small lump appeared on right lower eyelid. She consulted a physician who informed her it would not amount to anything. About 5 years ago it began to break down. Paste was applied about 3 years ago but it got worse. About 1 year ago she began treatment with X-ray and continued for about 6 months. Lesion seemed to get some better but never healed. The eye was very painful and there was destruction of the inner border of the lower lid. Eyeball red, inflamed and tender. She was advised by one man, to have the lower lid operated, which she refused. Several others declined to give any treatment. Pathological examination showed it to be an epithelioma. Radium was applied for two hours and was re-

peated at the end of a week. This seemed to aggravate the condition, and the period of application was reduced to one hour. The application was made once a week, for a period of three months. The ulcer has completely filled in with new tissue. There is a slight granular condition which persists, but it is diminishing gradually. The eyelid shows but little of its former destruction. She is still taking an occasional treatment.

CASE 5—Mr. P., aged 80, referred to me by Dr. Sims of Frankfort, Ind. Had large mole on left side of upper lip for years. About two years ago it became inflamed, discharged pus and formed a crust over the top. Painful at times. Pathological examination showed it to be an epithelioma. Application of radium was made at intervals of one week, and after 15 treatments, he is apparently well.

CASE 6.—Mr. K., age 54, engineer. Father died of cancer of the ear at the age of 82. He had an epithelioma over the left malar bone, which was removed with paste in December, 1913. It recurred in January, 1915. Increased gradually until at the time I saw him, it was as large as a dime. Application of radium was made at intervals of one week for about two months, and then at intervals of about once a month. After the third treatment there was a relief from pain and beginning retrogression of the lesion. He is clinically cured.

CASE 7.—Mr. K., age 67, brother died of cancer of the rectum. One aunt died of cancer of the breast. He first noticed a slight lesion on left cheek in August, 1914. This increased until it was about one-half inch in diameter, ulcerating, with a tendency to bleed and covered with a thick crust. Three treatments with radium of one hour each, at intervals of about 10 days, healed the lesion, and there has been no recurrence.

Patients who have been clinically cured should be kept under observation for several months, and they are instructed to the effect that the slightest recurrence of the lesion the treatment must be renewed at once.

Conclusion. Radium is not a cure-all by any means, but it will cure every case of epithelioma that is amenable to treatment.

Those who are skeptical about the results obtained from the use of radium are the uninformed.

Radium, intelligently used, is a painless, safe and efficient method of treating malignant skin lesions. It is the treatment of choice in epithelioma of the face, and the cosmetic effects are better than with other known method of treatment. This means much to the patient.

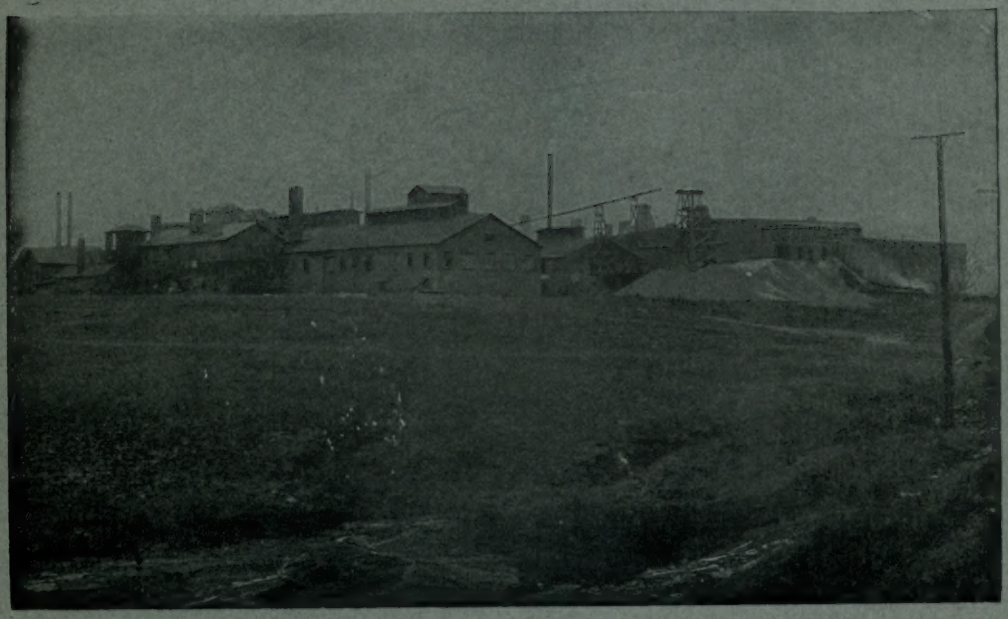
The number of treatments varies. Improvement usually is noticed after two or three treatments, and frequently after the first.

The analgesic action of radium is very marked and frequently noted following the first application.

It is claimed by competent physicists that there is a decided difference in the physical properties of X-ray and radium. Radium has cured cases in which the X-ray has failed.

STANDARD CHEMICAL COMPANY

PITTSBURGH, PA.



Reduction Mill of Standard Chemical Co., Canonsburg, Pa.

Miners of Uranium and Vanadium Ores, and Producers of Radium

STANDARD CHEMICAL COMPANY

RADIUM CHEMICAL COMPANY

Dermatological applicator (Type "A")

10 milligrams Radium Element

2 c. m. X 2 c. m.
(half strength)
Front view

2 c. m. X 2 c. m. m.
(half strength)
Back view

Brass Screens

0.25 m. m.

0.5 m. m.

0.8 m. m.

1.20 m. m.

Window Screen

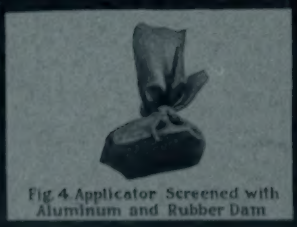


Fig. 4. Applicator Screened with Aluminum and Rubber Dam

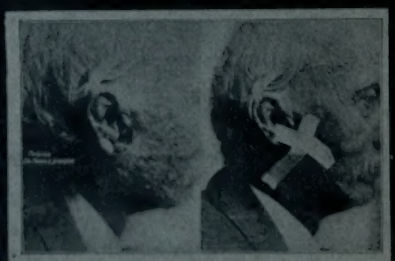


Fig. 2. Showing Lesion To Be Irradiated

Fig. 3. Applicator Under Adhesive Strips

Literature and Prices on Request

RADIUM CHEMICAL COMPANY,

Forbes and Meyran Avenues, Pittsburgh, Pa., U. S. A.